

M3 Model

(Linear Programming)

The Problem

- Assignment of participant (i) to position (j) through a compounded factor ($W_{i,j}$) that takes into account the following criteria:
 - staff years in position
 - selected preference (rank)
 - group classification (mandatory or voluntary)
 - job family affinity
- The objective is to assign Participants to Positions (one staff per position) at the maximum aggregated level of “satisfaction” (weighted preference)

The Variable

A given staff, in a given position (with corresponding preference)

$$X_{i, j} \begin{cases} 0 & \text{If the } i^{\text{th}} \text{ Participant is NOT assigned to the } j^{\text{th}} \text{ Position} \\ 1 & \text{If the } i^{\text{th}} \text{ Participant is assigned to the } j^{\text{th}} \text{ Position} \end{cases}$$

Where:

$i = 1, \dots, \text{NSP}$ (Number of Participants)

$j = 1, \dots, \text{NCH}$ (Number of Choices)

The Objective

Optimize overall staff level of satisfaction

$$\textit{Maximize} = \sum_{i=1}^{\text{NSP}} \sum_{j=1}^{\text{NCH}} W_{i, j} * X_{i, j}$$

Where:

$$W_{i, j} = \textit{Compounded_Factor}$$

The Constraints

Allocate one staff to each position in the pool

$$\sum_{j=1}^{NCH+1} X_{i,j} = 1 \forall i \quad \text{One choice per participant}$$

$$\sum_{i=1}^{NSP} X_{i,j} \leq 1 \forall j \quad \text{One participant per position}$$

Model highlights

- Use of individual preferences to optimize overall satisfaction
- Use of years in position, group classification (mandatory or voluntary), and job family affinity to weight staff preferences
- All participants allocated to unique positions
- Allows managers' trade-off analysis between alternative participants